



Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at <http://about.jstor.org/participate-jstor/individuals/early-journal-content>.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

EXPLORATION IN THE DEAD SEA REGION.

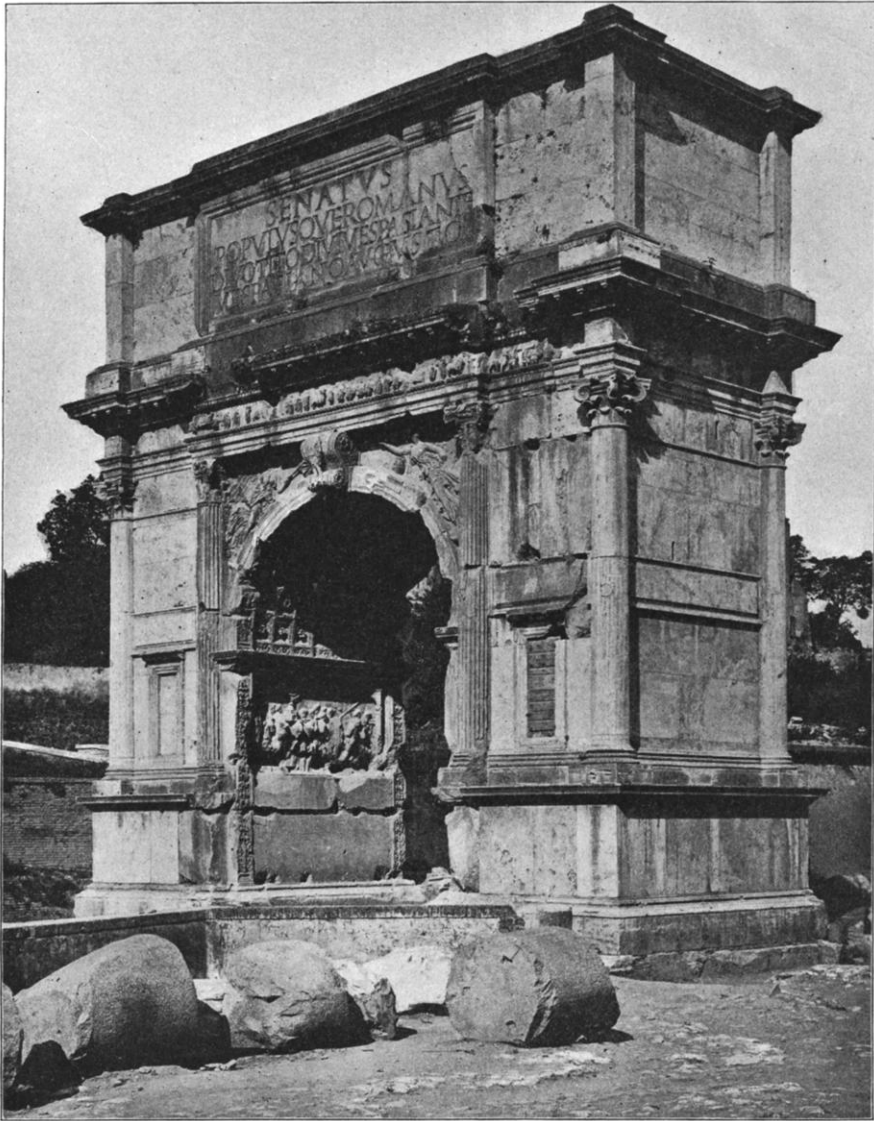
By REV. PUTNAM CADY,
Pastor Emanuel Presbyterian Church, Amsterdam, N. Y.

IN the *Historical Geography of the Holy Land*, Professor George Adam Smith gives a vivid picture of the Dead Sea region:

You cannot live in Judea without being daily aware of the presence of an awful deep which bounds it on the east—the lower Jordan valley and the Dead Sea. From Bethel, from Jerusalem, from Bethlehem, from Tekoa, from the heights above Hebron, and from fifty points between, you look down into that deep, and you feel Judea rising from it about you almost as a sailor feels his narrow deck, or a sentinel the sharp-edged platform of his high fortress. From the hard limestone of the range on which you stand, the land sinks swiftly through softer formations, desert and chaotic, to a depth of which you cannot see the bottom—but you know that it falls far below the level of the ocean—to the coasts of a bitter sea. Across this emptiness rise the hills of Moab, high and precipitous; and it is their bare edge, almost unbroken and with nothing visible beyond, which forms the eastern horizon of Judea. The depth, the haggard desert through which the land sinks to it, the singularity of that gulf and its prisoned sea, the high barrier beyond, conspire to produce on the inhabitants of Judea a moral effect such as is created by no other frontier in the world.

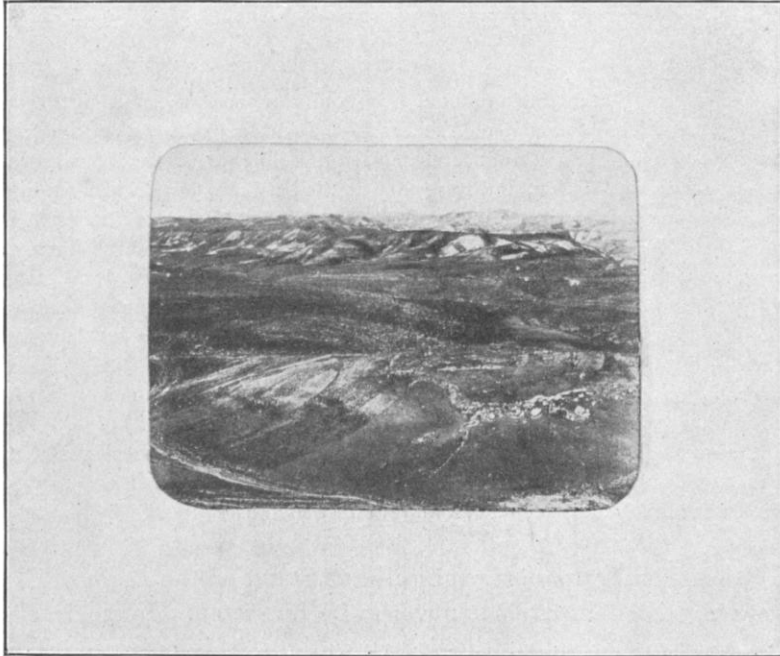
To descend into this awful gulf and stand on the shore of the Dead Sea is an experience never to be forgotten. Immediately after leaving Jerusalem the dreary wilderness is entered. The glare of the sun on the limestone rocks is blinding, and the utter desolation of the uninhabited region is oppressive.

The road usually taken is doubtless the one used by Christ as he toiled up those steepes to the Holy City. It is now a smooth carriage road, yet one is always glad when the nineteen miles between Jerusalem and Jericho are accomplished. There is no sign of habitation between the Apostles' Fountain, at the foot of the steep descent just below Bethany, and Jericho, save the Good Samaritan's Inn—a wretched Turkish café where coffee only is served. One has, therefore, ample time to become familiar with the rocks, the ravines, and the wild gorge of the



THE ARCH OF TITUS ON THE VIA SACRA AT ROME.

Wâdy Kelt. The windings of the road are innumerable and the turns often dangerous. Several times are seen far below on the right the shining waters of the Dead Sea, into which one seems to be plunging as if drawn irresistibly by unseen forces. On the right, hundreds of feet below, the brawling stream rushes down the Wâdy Kelt. Ahead, and far beyond, rise the mysterious



WILDERNESS OF JUDEA NEAR ENGEDI AND DEAD SEA.

mountains of Moab, looking like a wall erected by the Creator to keep back the great Arabian desert. These mountains attract and fascinate all who visit Jerusalem or Bethlehem. Although thirty-five miles distant from Jerusalem, they stand out distinctly as the afternoon sun falls upon them, and the cliffs and ravines are strongly emphasized with light and shade. But that which adds glory to them is the purple haze that covers them—a tint so decided and yet so soft that it never loses its charm.

When we at last stand on the shore of the Dead Sea, we are

three thousand eight hundred feet below Jerusalem and one thousand three hundred feet below the level of the Mediterranean. It is the lowest spot on the face of the earth. The waters of the sea are clear and of a greenish blue. For forty-two miles they stretch toward the south, with an average width



THE CLIFF OF ZIZ.

of eight miles. The Moab mountains rise precipitously along the eastern shore from two thousand five hundred to over three thousand feet; while the Judean hills, although not so high, loom up grandly with their lonely crags on the west.

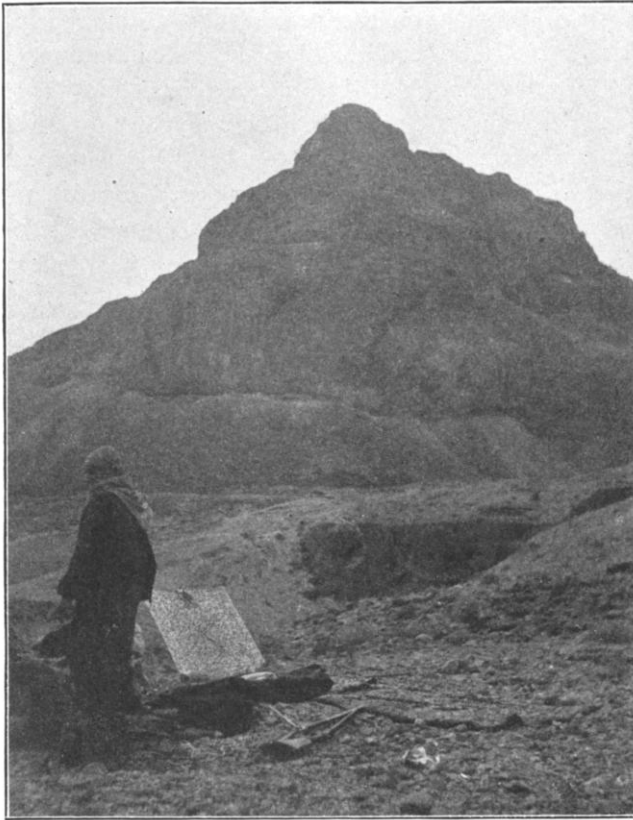
The first feeling is that of delight as the strange beauty of the sea encircled by purple-tinted mountains is gazed upon. Then the utter loneliness and desolation of the place is felt. There is not a single habitation along its shores; there is no

living thing in its waters ; no sail brightens its surface. To the westward and thirteen hundred feet above, the waves of the Mediterranean are breaking upon the sands and the cool breezes are blowing. But here the sun is pouring its rays fiercely down into this vast caldron, and the air is stifling. Somewhere here once stood the Cities of the Plain, and one is constantly reminded of George Adam Smith's statement that "in this awful hollow, this bit of the infernal regions come up to the surface, this hell with the sun shining into it, primitive man laid the scene of God's most terrible judgment on human sin. The glare of Sodom and Gomorrah is flung down the whole length of Scripture history."

All approaches to the Dead Sea are in keeping with its history and character. From Jericho the way is over the rolling and desolate plain of the Jordan, where the winds blow hot and the sun is blinding in its glare. If one approaches from Mâr Saba, he must come down the "Valley of Fire" (Wâdy en-Nâr) and other equally desolate valleys. If the approach is made by the Pass of Ziz to ancient Engedi, the same wild region—the wilderness in which David hid from Saul—is entered as soon as Bethlehem is left behind. The whole distance is made over a rolling sea of desolation until the top of the pass is reached, and then there is a sheer descent of hundreds of feet until one comes to the still more desolate shore. From that point, as one looks south, the dark and solitary Masada can be seen standing boldly out against the sky, towering seventeen hundred feet above the sullen waters. Forever associated with that fortress is the remembrance of the destruction of its defenders after Jerusalem was overthrown by Titus. Since that massacre the place has been abandoned and almost forgotten—left to itself with the Sea of Death on the one side and the dreary wilderness on the other.

Strange to say, the Dead Sea is but little known today. Tourists spend half an hour on the north shore and then hurry away. Explorers have gone over nearly every square mile of territory east and west of the Jordan, but have spent very little time on these mysterious coasts. Until our government sent Lieutenant Lynch out with a party of seamen in 1848, informa-

tion concerning this body of water was exceedingly meager. Costigan and Molyneaux, after whom Lynch named the points of El Lisân, had tried to solve the mysteries of the sea and had lost their lives in the attempt. Lynch spent twenty-two days on



MASADA, THE JEWISH FORTRESS, WEST SHORE OF DEAD SEA.

the sea, took soundings, and examined the shore line. But many questions were not answered by him, and many phenomena still await investigation.

Since Lynch's day no thorough examination of the sea has been attempted. Explorers have touched the shore here and there, and a small and unseaworthy sloop has been used occa-

sionally by the Turkish government to take supplies down the sea for Kerak; but this is all. The wretched and ill-smelling sloop is anchored in a lagoon near the mouth of the Jordan, its sole occupant being a mouse that kept me awake one night when I sought shelter in the craft. Several attempts have been made to run a small steamer on the sea, but it was evidently certain destruction to venture far out, and so the worthless craft is wisely kept tied fast to the bank of the Jordan about six miles from the mouth. A neat launch has lately been taken down to the Jordan, but the government will not give permission to use it on the sea.

As a matter of fact, navigation on the Dead Sea is dangerous. Costigan and Molyneaux found it out to their sorrow; and Lynch, who had sailed many seas as a naval officer, speaks of it with horror. As he emerged from the mouth of the Jordan with his staunch boats, a storm came up suddenly that threatened to end the expedition then and there. The waves pounded against the bows until the one made of steel plates was bent by the force. It was like a bombardment of waves of lead. Some idea of their weight may be gained from the fact that, while ordinary sea water contains from 4 to 6 per cent. of solid matter, Dead Sea water contains from 24 to 26 per cent. Perhaps Lynch's own words may be of interest: "At times it seemed as if the Dread Almighty frowned upon our efforts to navigate a sea, the creation of his wrath. There is a tradition among the Arabs that no one can venture upon this sea and live. Repeatedly the fates of Costigan and Molyneaux had been cited to deter us. We prepared to spend a dreary night upon the dreariest waste we had ever seen." Later on he says: "The curse of God is surely upon this unhallowed sea." He speaks also of being "in the midst of a profound and awful solitude." The Arabs could not understand why he should visit this place, and said that they had "often heard of the cruelty of Franks to each other, but never thought they would have sent one of their own countrymen to so desolate a place as this."

Lieutenant Lynch discovered that the southern half of the sea is shallow, with a depth of from five to twenty feet. The northern half plunges down thirteen hundred feet. The coincidence

will be noted between the deepest water of the sea and the level of the surface below the Mediterranean—both thirteen hundred feet. In fact, the bottom of the sea consists of two submerged plains, the one thirteen feet below the surface and the other thirteen hundred feet below. Running through the northern



NORTH SHORE OF DEAD SEA, LOOKING EAST.

plain from north to south, and corresponding with the Jordan valley and the Wâdy el-Jib in the Arabah at the south end of the sea, is the valley which marks the line of the great fault in the earth's crust. Until a few months ago the accepted geological explanation of this region was as follows: The earth split open and the western side fell in some five thousand feet, while the strata of the rocks on the eastern side were depressed only a little. The result is that on the western shore we see the Cretaceous

limestone, but the lower Cretaceous Nubian sandstone is buried far below. On the eastern shore we see the lower Cretaceous Nubian sandstone, rich in colors, and far above, on the high peaks, the Cretaceous limestone corresponding with the limestone strata on the western shore, but thousands of feet above it.



MOAB SHORE OF THE DEAD SEA.

Professor William Libbey, of Princeton University, calls this whole theory into question and denies that the sandstone on the eastern shore is Nubian. His claim is that the sandstone lies on the limestone and is a deposit. Erosion laid the limestone bare along the western shore, but the currents were not strong enough to wear it away along the eastern shore. I had never noticed sandstone on the western shore of the sea or along the western side of the Jordan valley, but Professor Libbey claims that during

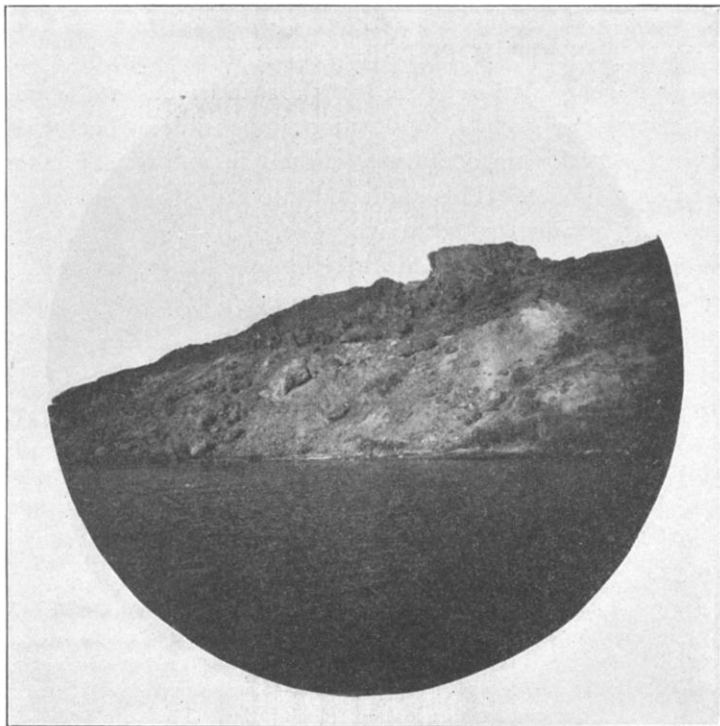
his explorations a few months ago he saw much of it along the Jordan valley on the western side. He did not explore along the western coast of the Dead Sea, but has no doubt that traces at least may be found there. The strongest evidence in support of his theory was found at Petra, where he thinks indubitably the sandstone is a deposit upon the limestone. If this new theory is true, then our ideas of the geological history of this region must be materially changed. Professor Libbey denies that the western side fell in to a depth of some five thousand feet, as the dip of the strata makes such a supposition impossible. There was a fault in the earth's surface, water rushed in and with it a great deposit of sediment. This hardened into sandstone and was then finally worn away as noted above.¹

I desire especially in this article to call attention to the eastern shore of the sea, and to give a brief account of an expedition I made down that coast in 1898.

My boat was probably the smallest that ever navigated those waters. I did not then fully realize the perils of the sea, or I would never have made the attempt. The boat was a flat-bottom

¹This hypothesis of Professor Libbey, which was first published in the *Palestine Exploration Fund Quarterly Statement* for October, 1902, is vigorously condemned as incompetent by Professor Edward Hull, LL.D., F.R.G.S., in the *Quarterly Statement* for January, 1903. He says: "[Professor Libbey] states that the subsidence of the Jordan-Arabah fault is on its 'eastern side;' the fact being that the subsidence, or *down throw*, is on the western side, as the relative position of the formations at each side of the valley show. . . . But perhaps the most surprising of all the statements in Professor Libbey's communication . . . is that which places the Nubian sandstone in geological sequence above the Cretaceous limestones, and as having been deposited after the formation of the Jordan-Arabah valley. There can be no mistake as to the author's statement, however surprising and contrary to fact, as he speaks of the 'immense deposits of sandstone,' including that of the city of Petra, as having been laid down in the Jordan-Arabah valley, and subsequently to the production of the great rift or fault of that valley. The real succession of geological events is, as is well known: first, the deposition of the sandstone; then of the Cretaceous and Eocene limestones; afterwards the production of the great rift or fault of the Jordan-Arabah valley. Consequently the sandstone underlies the limestones, and partook of all the terrestrial vicissitudes to which the latter formation was subjected. The author has apparently mistaken the remarkable old lake terraces which line the shore of the Dead Sea as being formed of sandstone. . . . An observer who has failed to grasp the more obvious geological phenomena of the region he has traversed can scarcely be looked to as a guide in subjects more recondite, such as the changes of level which the Arabah valley has undergone." [ED.]

skiff some twelve feet long. Securing the services of two men at Jerusalem, I launched out with them upon the Jordan. There was no room for a tent to be stowed in our limited quarters, and only a small amount of provisions could be taken. Our greatest care was to guard our six-gallon tin of fresh water. I had pre-



ANOTHER VIEW OF THE MOAB SHORE.

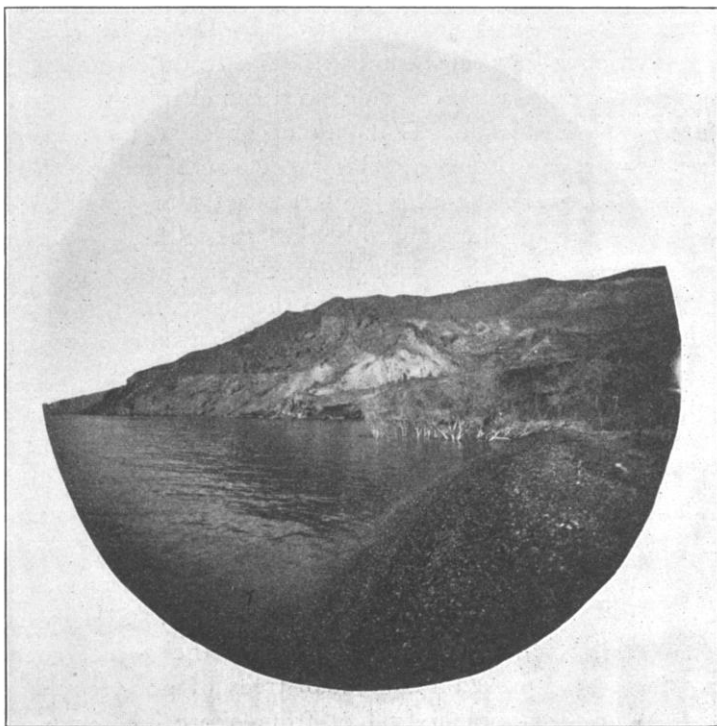
viously made an attempt to explore the western shore with a larger boat, but a storm had knocked its bottom in on the rocks and we were obliged to walk some fourteen miles to reach Jericho. As this small skiff was the only remaining boat on the Jordan, I had little choice in the matter of a craft.

I determined to sail close to the shore and to land frequently. No one had done this since Lynch explored the sea in 1848. Beaches spoken of by Lynch no longer exist. This is especially

noticeable between the Zerka Mâ'ain (Callirrhoe) and the Wâdy Môjib (Arnon). For mile after mile the waters dash up against precipitous cliffs. I found only a few landing-places and was constantly impressed by the fact that a storm coming up quickly might swamp a large boat before a landing could be made. The varying water level of the Dead Sea is being investigated, and repeated measurements are being taken by Dr. E. W. G. Masterman at a rock near 'Ain Feshkhah. The Arabs say that a few years ago it was possible to ride on a camel from the western shore over to El Lisân. That cannot be done now. Within recent years travelers coming along the south end of the sea have passed between the cliffs and the water at Jebel Usdum. Now they are compelled to go behind the cliffs, as the water leaves no beach. At the north end of the sea, just opposite the point where pilgrims usually come to the shore, there was a few years ago an island a short distance out, with a submerged causeway leading to it. But this island, Rujum el-Bar, has not been seen since 1892. Whether this rise of the water will continue indefinitely it is impossible to say. But when we are told that the Jordan pours about five million tons of water into the sea every twenty-four hours, it is at once apparent what an amount of work the sun has to do in carrying so much away by evaporation.

In connection with this rise of the sea level is a curious fact that I noted at several points along the coast. Shortly after leaving the Jordan, while coasting along the northern shore toward the east, I passed a number of trees of good size standing in the water about sixty feet from shore. They had no leaves or branches and were incrustated with saline deposits. At the mouth of the Callirrhoe the vegetation is rank and extends far out into the sea, so that it is impossible to get anywhere near the mouth of the river by means of a boat. I am not speaking of the bushes that grow in the deposit brought down by the river, but of the growth in the Dead Sea water. At several other points along the coast where streams of fresh water come down, the same kind of growth was observed. At the mouth of the Arnon it is even more abundant. Fair-sized trees grow there in ten feet of water.

I reported these facts to the Palestine Exploration Fund and received a note from Dr. George E. Post, of Beirût, Syria, whose book on the flora of Palestine is an authority, asking me whether the shrubs and trees were yet alive. His theory is that the level of the sea has been elevated in recent years, overflowing areas



TREES GROWING IN DEAD SEA ON MOAB SHORE.

on which this vegetation was growing. The trees were certainly yet alive, and doubtless Dr. Post's idea is correct. If there is still volcanic action in this region, as some suppose, the land may have dropped and also the volume of water increased.

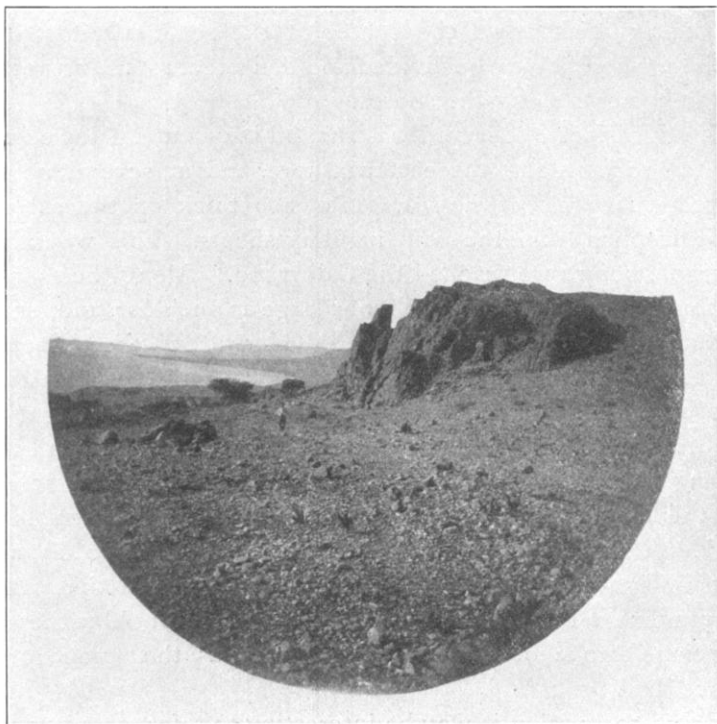
A second fact that excited my interest was a strong current setting northward. I observed it all along the eastern shore. Lieutenant Lynch noticed a similar current at Engedi on the western shore. Sir Charles Wilson in commenting upon my

report said: "It would be interesting to ascertain whether this is a constant current due to subterranean affluents, to unequal barometric pressure, or to wind action." Inasmuch as this current was strong when the sea was as still as a mill-pond, it would seem that it must be due to one of the causes suggested by Sir Charles Wilson. Possibly the force of the Jordan may be sufficient to make a current down the center of the sea until it strikes El Lisân, where it may be divided and deflected, returning northward in currents along the shores.

The third fact I observed was that oil in quantities flowed out from the rocks along the eastern shore, and at several points covered great areas of the sea. It was so thick on the surface that it dropped from the oars in filmy sheets. This was most noticeable before we reached the Callirrhoe. Along the shore I also found pieces of pure sulphur as large as one's fist, and lumps of bitumen as large as a man's head. Here are all the elements, save a stroke of lightning, for a great conflagration. The Arabs tell of vast islands of bituminous matter that were brought up from the bottom by an earthquake some years ago. While I was crossing the Jordan plain from Nebo to the river some weeks after this expedition, I witnessed the most terrific thunder-storm that I ever saw. Black clouds seemed to rest on the sea, and sheets of lightning were apparently extinguished in the water. Every moment I expected to see what Abraham of old witnessed when "the smoke of the country went up as the smoke of a furnace."

In this connection it may be interesting to refer to a phenomenon recently witnessed by Mr. Gray Hill, Esq., at Jerusalem. His house stands on Mount Scopus, and from it he is able to look far down the eastern coast of the Dead Sea. On an evening in May, 1899, Mr. Hill's dragoman called his attention to repeated flashes of light coming apparently from a hollow in the mountains just north of Môjib and a little above the surface of the Dead Sea. It was not lightning. It did not flash across the sky, and the night was cloudless. It flashed upward from this hollow and from nowhere else. The flashes continued at rapid intervals of a second or two until 9:30 P. M., when he retired to

rest. The dragoman reported that he still saw the flashes going on at 2:30 A. M. They were extremely strong, and the scene was most impressive, such as to set one thinking of Sodom and Gomorrah. Mr. Hill conjectured that the flashes were due to the ignition of naphtha or petroleum.² The phenomenon occurred



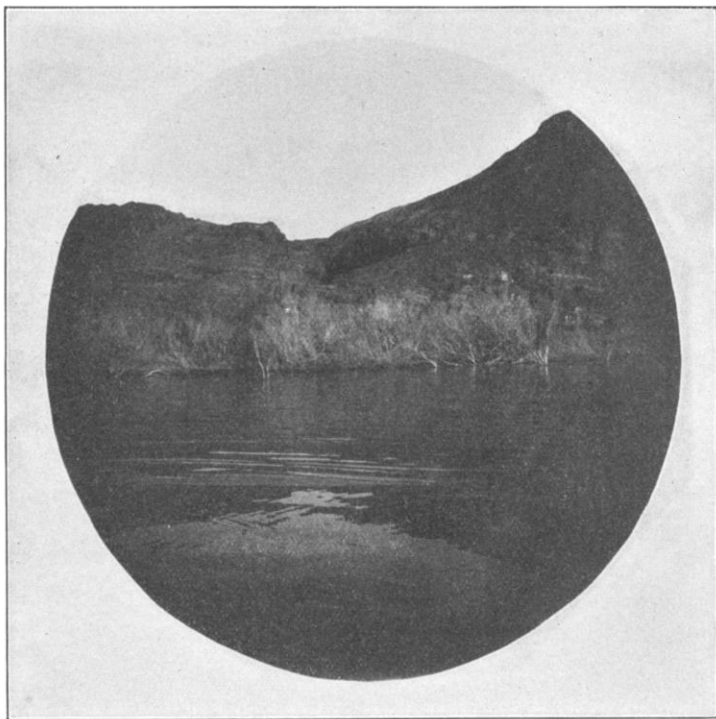
WEST SHORE OF DEAD SEA, FROM ENGEDI TO MASADA.

just about where I saw the oil in greatest abundance flowing out from the rocks.

Another fact of interest that I noted is the following: On three successive nights at 7:30 o'clock, when no air was stirring, and the sea was perfectly smooth, a great breaker came in from the sea and crashed upon the beach. After a short interval another wave followed, and then they commenced to come in

²See Mr. Hill's report in the *Quarterly Statement* for July, 1900.

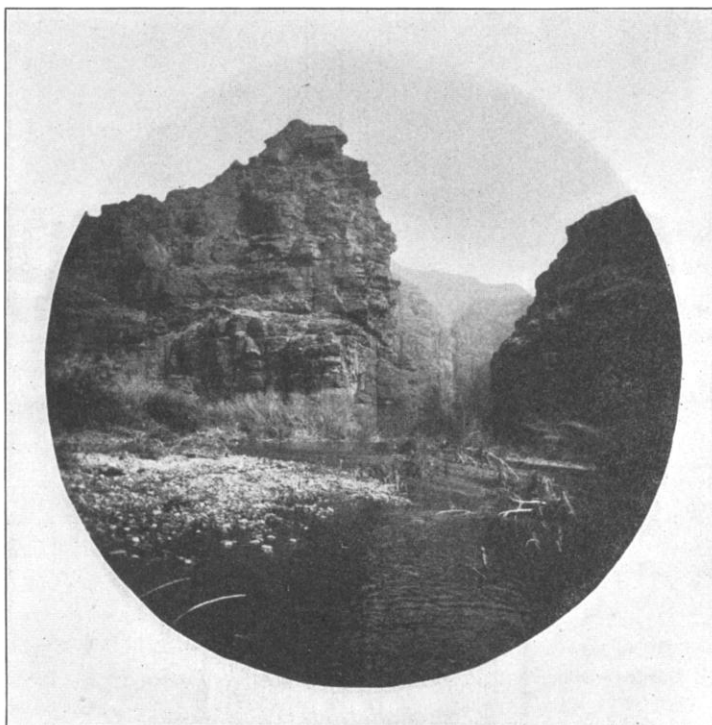
quick succession until the noise was deafening. We hastily pulled our boat out of their reach, or it would have been dashed into pieces. During all this bombardment, which lasted about an hour, not a breath of air stirred. Then the sea became quiet again. When the first breaker came in on the first night, I was



ENTRANCE OF CALLIRRHOE RIVER INTO DEAD SEA.

lying asleep on the beach. The noise sounded like a wild beast crashing through the jungle, and I sprang to my feet in alarm. Sir Charles Wilson suggests that the phenomenon may be due to a change in atmospheric pressure resulting in disturbances like the *seiches* on Lake Geneva. Professor Libbey told me that when he camped at Tafilah, southeast of the Dead Sea, at about 7:30 in the evening, the air rushed down toward the Dead Sea as if it were being sucked into a whirlpool. It nearly carried

the tents away, and he could hardly stand against it. I noticed the same thing at the Callirrhoe one night. The atmosphere was very warm, and I thought it a fine opportunity to take a bath in the warm waters of the river. I clambered over the rocks, disrobed, and plunged into the steaming waters, famous



ENTRANCE OF ARNON RIVER INTO DEAD SEA.

through all the centuries for their healing properties. But I didn't stay in long. A continuous volume of cold air rushed down the cañon, and I was glad to escape as quickly as possible.

During the day, while rowing on the sea, I frequently noticed a phenomenon reported by Lieutenant Lynch. Suddenly heavy swells would come from the center of the sea, but not a breath of air would be felt. However, within fifteen minutes the wind

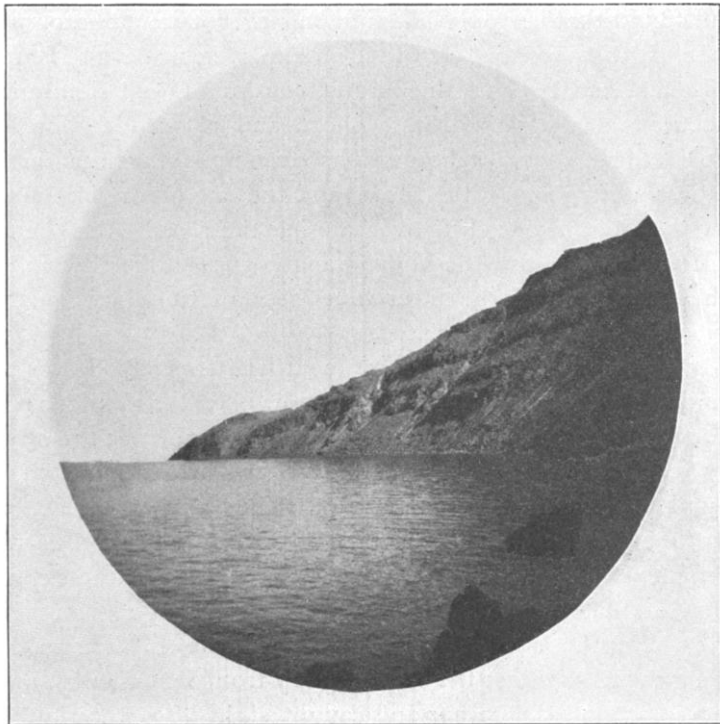
was sure to come. I always sought a landing-place as soon as the first swell was felt. But at night no wind followed the breakers, at least during the three nights that I was able to make observations. During the other nights spent on the sea the wind blew furiously day and night.

My objective point on the east shore was the Wādy Mōjib. I had found that not only had no one ever taken photographs of the Moab shore, but also that no explorer, not even Lieutenant Lynch, had gone up the Arnon chasm. I had determined to secure photographs of this shore and also to explore the Arnon. The several photographs accompanying this article will give a fair idea of the shore, and the one of the chasm will show the magnificent cliffs overhanging the river. But the rich coloring of the rocks, the higher range of mountains dimly seen in the distance, and the utter loneliness of the place, must be seen and felt to be appreciated.

By reason of the fact that my boat was so small, I was able to pull it up over the rapids and shallow places to the deep pools beyond. The chasm is quite one hundred feet wide; the stream forty feet wide and one foot deep. After going about 450 feet I found the chasm turning sharply to the south, where it narrows to fifteen feet. A few yards more and the cañon narrows to four feet. The water rushes down furiously and the sky is a ribbon of blue far above. By wading, I managed to reach a point where the stream turns sharply to the east again, and, bracing myself against the wall to keep from being swept away, I peered around the corner and caught sight of a waterfall just beyond. No idea could be gained of its height, but it must be considerable as its roar can be heard on the beach. Farther progress was out of the question, and it was evident that it must be impossible to follow the Arnon from the interior down to the sea. Professor Libbey made careful measurements of the Arnon chasm about fifteen miles back from the sea and found it four miles across and 3,500 feet deep. It is no wonder that Israel went around it eastward instead of going down into it and up the

of the Arnon are cool and sweet, with many fish of considerable size swimming in them.

To return to the Jordan involved more excitement than I had anticipated. A storm came up, and we experienced all the dangers that every explorer on that sea has met. We found that the



MOAB HEADLAND ON THE DEAD SEA.

wind generally died down between the hours of one and four in the morning, and we quickly improved these favorable opportunities. But the waves were always high—the storm lasted twelve days—and we were often in hard straits, in the darkness, with wind and waves rising higher and no landing-place visible in the darkness. The water and sun had cracked our hands and faces, and made them very sore. Our shoes were coming apart, and our clothing was stiff and greasy. Often almost in despair

we sighted a little beach at the foot of a cliff and landed with difficulty, jumping into the water before the boat struck the rocks and holding it off until we could lift it to a place of safety. We then became thoroughly aware of the fact that if our boat were lost it would be impossible for us to scale those cliffs and get back to the Moab tableland.



IN THE PLAIN OF THE JORDAN.

At last one morning about four o'clock we were literally thrown by the breakers upon the north shore east of the mouth of the Jordan, and crawled behind some bushes to escape the fury of the wind. At daylight black clouds came pouring over the Judean hills and the rain fell in torrents. My men went out in search of a Bedouin camp, and soon returned with a camel and some Arabs. We loaded boat and baggage on the camel and

trudged through the mud to Sheikh Kûftan's camp, where I passed through various vicissitudes during the two days and nights that the storm kept me there. To relate how I finally escaped, and lost my boat before reaching the Jordan, would require another paper.

It will be seen from my narrative that the Dead Sea is no respecter of persons, and has served all explorers alike. It is as strange and mysterious as ever. Mr. Gray Hill warns against all attempts to venture out upon it unless one has a staunch vessel. I repeat the warning. The sea may appear fair and inviting to the tourist who lingers but a few minutes on the north shore, but, beware!